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Report of the Nebraska Conservation and Soil Survey

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The last legislature voted the Conservation and Soil Survey $6,000 for the biennium to be used for postage, publication, equipment, and the expenses of conventions, laboratory, and field work. During the year several persons rendered assistance in the various lines of investigation without salary. Only their expenses were borne by the State. The director attended several national conventions and represented the State therein to the best of his ability. In each place he was called upon to speak for Nebraska, or upon the subject, Conservation of Business, in which our State is assuming a leading position. Among the gatherings of this kind were: the National Conservation Congress, the National Association of Conservation Commissioners, the National Irrigation Congress, the National Rural Life Congress, and the Kansas City Land Show.

Quite a number of conventions, institutes, and other gatherings were visited in Nebraska during the year. Among these were the various meetings held by the Nebraska Rural Life Commission, farmers' institutes, teachers' institutes, the Omaha Land Show, the State Association of Commercial Clubs, the State Meetings of Associated Agriculture, etc. At these a discussion was given on one or more of the following topics: The Resources and Industries of Nebraska, Conservation of Business, Rural Sanitation and Health.

Nebraska Conservation Congress.—The congress last year was largely attended, and judging by the results it must have been a very helpful meeting. By action of the president and executive committee the congress of this year was postponed from spring to fall because of politics. That is, this was done to prevent political entanglements, for it so happened that considerable thought of Nebraskans was directed, in the springtime, to a discussion of progressive and stand-pat policies. Some of the speakers we had secured were known to lean very strongly towards the support of one of these policies and would have held political meetings on the side. It seemed therefore the proper thing to wait awhile with the congress, or until the preliminary fights in politics were decided. Our citizens can then come together with the one dominant idea of discussing development problems that have value in Nebraska. The congress will be held late in the fall or early winter, and should be attended by hundreds of patriotic Nebraskans.

Information Bureau.—During the past year hundreds of inquiries were made at the office of the director concerning the State's resources and industries. In several cases it required considerable time to prepare reliable reports to these inquiries. It is plainly shown by the interest in the State and the information desired from without that there is great need for reliable data in the form of maps, industrial reports, and other state papers.

Conservation Problems.—A part of the fund voted by the legislature is being used for special studies. Problems connected with the sand-hills are being worked out by Professor Pool, Dr. Walker, Professor Wolcott, Mr. Carl Modesitt, and several others. Professor Pool, of the botany department, is now in the field. He spent about three months of the past year in beginning specific studies of sand-hill forage, which will require three or four years of time, and may show results of considerable economic value to the State when completed. Dr. Walker and others, also of the botany department, are working on the plant life of the sand-hill lakes for the purpose of determing its relations to fish food. They are studying also the legumes in the sand-hill forage. The plant study of the sand-hills by Professor Pool, Dr. Walker, and others is being directed by Professor C. E. Bessey. All the Conservation Survey has to do in this respect is to pay a part of the traveling expenses.

Dr. R. H. Wolcott has for several years conducted a survey of the native animal life of Nebraska A considerable part of his investigation has been directed to the fish life in the sand-hill lakes and to game in that region. His studies require also definite investigations in regard to the chemical composition of lake waters. Our only expense in connection with Professor Wolcott's work is for car fare and a part of the field expenses. Professor Wolcott summarizes his work and results as follows:

"A considerable part of the summer of 1911 was spent in the northwestern part of Nebraska, mostly in Banner county, where the object was to determine the physical conditions controlling the distribution of native plants and animals to serve as an index to the agricultural possibilities of these regions. In this investigation the work was shared with Professor Pool. Our investigations went to prove:

"1. The conditions outside of the canyons are such as to show that little of the territory is available for agricultural purposes, though suited to grazing. Rainfall is not evenly distributed, and soil belts occur throughout on which dry farming may be profitably carried out. In the canyons temperature and moisture conditions are such as to indicate that a considerable amount of fruit-growing could be made profitable.

"2. So far as animal culture is concerned, numerous opportunities for the development of ponds in which fish culture could be carried on are presented by the drainage ditches, and there has been, up to the present time, no step taken in the direction of realizing such possibilities. It would seem also that in the canyons were numerous places where it would be feasible to establish farms for the rearing of fur-bearing animals for their fur.

"Our studies were renewed in Cherry county. The problem of the sand-hill lakes, with particular reference to their availability for the rearing of fish, has resolved itself into the investigation of two distinct questions. It seems probable that the percentage of salts in these lakes may directly affect the fish and determine the availability of any given pond for fish culture. This problem has been attacked in the laboratory in

connection with the investigation work of the departments of chemistry and zoology, but as yet no definite results have been attained. Another feature which undoubtedly is important in determining the availability of these ponds in the culture of fish is the problem of food supply, though it is probable that this in the long run will resolve itself into a question of the degree of alkalinity, since in the lakes which are more strongly alkaline the growth of an abundant aquatic vegetation is impossible, and in the absence of this the development of a varied and continuous supply of animal food for the fish is out of the question. Much of the time during the past summer was devoted to an investigation of the temperature conditions within the lake, and here the vegetation has a very marked effect, holding the temperature down during the summer and maintaining it at a higher level in the winter, in proportion to the amount of vegetation present. It is hoped that these investigations may be further supplemented by field work during the summer of 1912, and that on the basis of this, together with the work done in the laboratory and by the department of botany, it may be possible within the next year to make more definite statements than can now be made as to the precise conditions which must be present in any given pond in order to make it profitable to undertake fish culture."

Mr. Carl Modesitt has made a special study of the chemical composition of the sand-hill lakes during the past year. He finds potash apparently of economic importance in a few lakes. He will continue his study during the current year.

Scenic and Historic Places.—Mr. A. E. Sheldon, director of the Nebraska Legislative Reference Bureau, who has an intimate acquaintance with Nebraska, is to report upon the conservation of certain scenic and historic places in the State. This will require a small expense for field work in securing photographs and data.

Rural Sanitation and Health.—For several years certain persons connected with the University and working with the health bureaus, physicians, teachers, and many others, have been interested in a survey of rural sanitation in Nebraska. During the past year a small part of the Conservation fund was used for this purpose. Addresses on the subject were made by the director at several agricultural conventions. A discussion on rural sanitation and health is included in this report.

Conservation of Business.—Nebraska has assumed a leading place in the agitation for business on the square. The director of this survey advocated the application of conservation principles to business two years before the Blue Sky Law was passed in Kansas, first at a national conservation meeting at Washington, D. C., in 1908, then at National Conservation Congresses at Seattle, in 1909, St. Paul in 1910, and Kansas City in 1911. At these places the attention of many states was called to the importance of safeguarding business by compelling illegitimate concerns to abandon their promotion. In cooperation with several state organizations a special committee is now framing a law for introduction to the

next state legislature. A brief discussion of this topic is found elsewhere in this report.

Farm Management.—During the past two years the conservation fund has been drawn upon for use in defraying a part of the field expenses of persons engaged by the United States Department of Agriculture in making a Farm Management Survey of Nebraska. This work is done in cooperation with the Farm Management Department of the University, and directed by Professor Pugsley. Two counties have been about completed.

Soil Surveys.—The State Soil Survey is directed from the University. Its field work is being projected as rapidly as possible consistent with the funds available for its support. During the past year Professors Bengtson, Scarborough, and Lackey were at work in the Big Nemaha, Weeping Water, and Logan valleys. This summer a complete soil survey of Otoe county is to be finished by the joint work of the United States Bureau of Soils and the Nebraska Soil Survey, each paying half of the expenses. State work is to be carried on in several counties.

Study of Selected Industries.—The Survey is gathering information on the various leading industries of the State. This can be done at relatively small expense because of the opportunities afforded to reach all parts of the State in connection with other work, and because of the availability of good cameras and other necessary equipment. It will require much time and careful work to make these investigations. The aim will be to secure only reliable facts and to assemble them in a way that will present the truth without misrepresentation. Nebraska has been slow to gather and publish information concerning her resources, industries, and commercial development. The time has come, in the opinion of many citizens, when we should do this work. After the industrial facts have been assembled, let their dissemination or publication be placed in competent and responsible hands.

Publicity.—There is a growing demand for state publicity in Nebraska. This demand is held in common with several other states, especially the newer ones. Just what part the Conservation Survey is to assume in this publicity is not determined. It may only supply data for a department yet to be created. The purpose of such publicity is not fully agreed. The tendency towards unwarranted promotion, such as occurs in some states, should be avoided because such advertisement works a positive injury in the long run. A few advocates of publicity appear to think that the principal object should be to attract people to Nebraska to increase the population. Others want to advertise the resources and industries at large. We will not discuss the strong and weak points in each of these purposes, but will venture to state that a yet more useful object of publicity would be the advocacy of useful facts within the State. Publicity of this kind would promote development by doing a kind of industrial extension work. Its data would be supplied from the various organizations and departments directly connected with industrial development, experiment station work, and field surveys.

This brief resume is followed by special papers on conservation work.

THE CONSERVATION OF RURAL HEALTH

By G. E. Condra.*

This paper is a health message for people in the country and small towns. It is based on information gathered by persons who have had opportunity to study rural conditions in Nebraska, visiting thousands of homes in different parts of the State. Among those who have contributed are: State food inspectors, commissioners of public health, city health commissioners, several physicians with country practice, many farmers and rural teachers, and the Dean of the Medical College of the University of Nebraska. As a result of these observations and experience therewith, certain specific things that should prove helpful in improving rural life are herein recited. They are given without bias and should be so considered.

The striking thing in the development of public health in the United States, and apparently so in Nebraska, is that the country is not keeping pace with the city.

It is evident, also, that the country presumes too much on its healthful conditions, and fails to develop certain advantages which it has over the city. Let it be understood that Nebraskans have better than average health, a fact worthy of praise, but that our pride should not serve to prevent the best possible conservation of life. It should not be our purpose, therefore, to lead other states, but to become as healthy as possible, knowing that human health and life are the State's greatest resources. Let the ideal be the development of the largest possible number of healthy persons capable of rendering efficient service, physically and otherwise, and fit to bear the new generation. Viewed in the light of conservation, bad health is not a resource but the opposite; good health, the normal condition, is always at a premium.

Most attention first given to conservation was to the physical resources, then to the betterment of strains and breeds of crops and farm animals. This bore fruit in many lessons concerning life which are now known to apply in some measure to the conservation of people. Today more than usual consideration is manifest for the development of public health and ability to work. Health is promoted by many popular and scientific organizations. State departments deal directly or indirectly with the conservation of most vital resources, including man. The Federal government is about to establish a department of public health. The new turn in conservation is in order and timely, for reliable authority places the number of dangerously sick persons in the United States at about 3,000,000 and the annual deaths at about 1,500,000, of which more than 600,000 are by disease nearly wholly preventable. The economic loss from negligence resulting

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in such a death rate represents a vast sum. Good authority has placed the national loss from preventable sickness, preventable death, and the necessary care demanded therewith at about two billion dollars a year. It is plainly evident that too many people are sick in the United States, causing such an expense and requiring so much time in the way of care and medical treatment.

The way to check a part of this loss of time and life is being found. Students of the subject say that sickness is reduced, the death rate decreased, and the average length of life prolonged about in proportion as individuals and the public practice the principles of personal hygiene and sanitation. So, it appears that the great need of this time is a more definite and reliable knowledge of the cause and prevention of disease.

Cause of Disease.—Only a short time back in history law-giving, religious ceremony, and healing were practiced by one and the same individual. Then practically nothing was known of the cause, and consequently very little of the prevention and treatment of disease. During the past century, and the past twenty-five years especially, scientists have given much time to the investigation of diseases as produced by natural causes. The microscope made it possible to study the minute forms of life and determine their relations to higher life. Such investigation gave a new conception of many diseases, in which the cause is found to be in the lower forms of life, such as bacteria and minute animal parasites, that gain access to the body and feed upon it when and where the conditions are favorable. Not all bacteria are of the disease-producing kind; in fact many of them do a beneficial work, especially in the field of agriculture. Most diseases that spread from person to person are said to be contagious because they are catching. Society finds it necessary to guard against the spread of such by the use of disinfectants, in which the germs are killed, and by quarantine, in which the sick are isolated for a safe period of time.

Though there are many disease-producing organisms, not all of them have been studied in detail. Certain ones are known to cause specific diseases such as cholera, yellow fever, scarlet fever, diphtheria, measles, chicken-pox, whooping-cough, tonsilitis, mumps, syphilis, tuberculosis, etc. Put in a simple way, it may be said that our bodies represent the soil or ground and the germs the seed, which, if it finds a suitable place to grow and multiply in the body, does so, thereby causing a particular kind of disease.

The following, if done, would assist in reducing the amount of sickness and death by contagious diseases:

1. Cleaning up the farmstead and thus destroying filth, the home of specific germs.

2. Preventing the spread of germs from host to host.

3. Increasing the resistance of the body to germ infection through proper attention to diet and elimination.

A knowledge of contagious disease is giving rise to public sanitation which is rapidly gaining prominence in the various civilized countries. The United States succeeded with its wars in Cuba and the Philippines,

and with the Panama Canal chiefly because of sanitation. Yellow fever and malaria especially were stamped out by the use of scientific knowledge. No one will deny the wisdom of cleaning up Cuba and the Philippines, but why not apply sanitary knowledge of such importance to our own situation in the interior of the United States, especially in the rural districts? It would make the people healthier, and prolong their lives from ten to fifteen years.

It is important to know how disease gets into our bodies, or, in other words, how it is transmitted.

Means of Transmission.—Transmission or spread of disease-producing organisms is mainly through air, water, food, and by insects. The fly and mosquito play a large part in spreading tuberculosis, typhoid, and malaria. In some diseases transmission is mainly by contact of persons; to be more exact, by the contact of parts of their bodies. Some diseases are transmitted more in one way than another; consequently they are known as air-borne, water-borne, or food-borne diseases, etc. Knowing this, one should guard against infection from the different sources.

It should be more generally understood that a person suffering from a contagious disease, such as tuberculosis, typhoid, or syphilis, may become a menace to society unless the necessary safeguards are observed. He is unclean, and therefore a probable source of danger.

Sanitary Water.—Drinking water of the farmstead should be guarded with extreme care, for it may become the leading medium through which disease is carried to the body. Attention is paid to the kind of water supplied to farm animals, for a good quality is necessary to produce health and a rapid growth. Some farmers argue against pond water and polluted stream water for stock. Much of this is well-founded, for it is good business. Be that as it may, we are sure that farmers should consider the water problem as having great importance as a factor in human health. As a rule, the domestic water supplies of Nebraska are obtained from wells. It is purer than that from streams, lakes, and most other sources. Furthermore, the well water supply of our State is one of the best to be found in any country. Notwithstanding this fact, there is need for improvement at many places. A considerable number of wells are located on either alkali or hard-water formations whereas near by, and sometimes on the same farm, supplies could be secured of better quality. It is the duty, therefore, of the farmer to seek out the best possible supply of water, getting that which is most ideal from the standpoint of health. The leading thing to guard against in most wells is organic pollution from slops, garbage, barnyards and privies. A better knowledge of the nature and source of well water would serve to show the cause of such pollution. Briefly stated, the rain water, except that which runs off, soaks into the ground and percolates downward to the water table. Below this the subsoil is completely saturated, and the water moves slowly in the direction of the lower land, where it may come to the surface in the form of seepage or springs. During its percolation and slow underflow in the ground, the water gathers up more or less organic matter, including germs of

disease, if they are present, and may carry them to the well. The well is an artificial opening in the ground extending down to and below the water table. The more water used therefrom the greater the movement to it by underflow. The following statements are intended to be of use in making well water more sanitary:

1. The privy or cesspool should not be placed too close to the well. The distance can not be definitely given because of differences in the texture and structure of the ground. In many places privies and wells are not more than twenty-five to fifty feet apart. Such situations should be regarded as positively dangerous unless the well is deep and the subsoil very close textured. The only safe practice is to widely separate the well or sources of water from the place in which is placed the most dangerous of matter, namely, the excreta of the human body. The deeper the well the less the danger from this source, as a rule.

2. Wells should be placed on higher ground than farm buildings, lots, and privies, especially, if possible. This gives surface drainage away from the well and not to it. A better rule than this, since many farm homes are on valley and upland plains, is to locate the well up-valley or up-plain from the house, lots, and privy. In this way the underflow, extending with the general slope of the land, comes to the well before being polluted. To meet this condition, most wells in the State should be west or northwest of the house and outbuildings. This is because the general slope and drainage, both surface and underground, is eastward or southeastward. The water, if polluted while passing under the outbuildings and lots, has ample time to purify before reaching the next farmstead on the plain. Often the general unqualified statement is made that wells should be placed on higher ground than the rest of the improvements of the farmstead. Such a rule would not hold good at all points on valley sides, as along the Republican and Niobrara valleys, where such a location would not prove feasible because of a lack of water at some places.

3. Open wells should be cleaned frequently for the purpose of removing any dangerous matter that may have fallen into them or blown into them. Closed wells are safer than open wells.

4. The ground should be graded up around the well to carry the surface drainage away from it. Furthermore, the opening should be tightly covered to prevent the intake of excreta from birds, chickens, etc. This will also guard against the entry of mice, rats, frogs, and rabbits, and the unsanitary effects resulting therefrom.

5. In most parts of the State the water is in sand beds called first, second, and third water, etc., and separated by thin clay layers. The first water at places is more alkalied than the second or third water. It is also apt to contain more organic pollution, being on that account less desirable for drinking purposes. It is recommended, therefore, that the second, third, or lower water be used when available.

It is positively known from many examinations that too little care is given to the conservation of healthful water supplies. In many instances farmers are using water from wells in which are remains of dead animals.

In some cases the hair from these being brought to the surface by pumping or in the bucket is apparently not sufficient evidence to indicate the possible presence of an animal in the well. Chickens and geese on some farms have access to the covering of the well in which the boards lie loosely. Many wells are not graded, thus receiving a portion of the surface drainage from yards and lots, as the case may be. In a few places this drainage is from manure piles on which have been thrown human excreta, making a dangerous situation.

Disease is also spread by careless methods of using drinking water supplied from sanitary sources. Germs of the sick are carried to new hosts by drinking in common from buckets, dippers, cups, etc. Most communities have patients suffering from tuberculosis, and the contact of their lips with the cup or other vessel is apt to leave germs thereon. The next person using the cup may receive the germs into his body. A knowledge of hygiene and sanitation should be sufficient to cause us to refuse to accept this risk or chance of becoming infected. The "old oaken bucket" from which tramps and all others could drink to their mutual danger has no virtue in the light of knowledge. Neither have sentiment and ignorance a place in the conservation of health. The criminality of using drinking cups in common is established. Not a few, however, some farmers included, believe these things to be faddish, thus in a small way retarding progress in health development. It is now very generally agreed that all public drinking places should be so installed as not to permit the slobbers of one person to enter the body of another. The use of drinking fountains and individual cups is therefore a sane, sanitary measure, and should be encouraged. This is not so necessary in the home because all members of the family may have good health. It is the part of good judgment, however, to discourage the old practice wherever there is apt to be any danger, as in schools and churches. Individual cups and towels should be used by each sick member of the family. Unsanitary water should not be used until sterilized by boiling or by the use of calcium chloride.

Drinking from streams in thickly settled communities is to be discouraged, because such water may be polluted from the carcases of dead animals, excreta of farm animals, and the bowel discharge of people. Many examples of sickness and death are known to result from the careless use of such unprotected water. Furthermore, persons accustomed to a given water supply should be on their guard when traveling through the country and drinking from unsanitary wells. It is the part of wisdom to refrain from drinking such water. In some localities, practically every well is safe, in others most are unsafe. Many examples of typhoid are traceable to unsanitary wells; the same is true of local epidemics. Many intestinal diseases as dysentery, diarrhea, typhoid, etc., are transmitted by water. It is good economy for the country to guard against the spread of water-borne disease because of their bad effects on society. Let it be known that pure water is absolutely indispensable to health, and that the supply should be guarded both as to source and method of use.

Ventilation and Pure Air.—Much has been said and written regarding the value and importance of good air and ventilation. This has resulted in considerable improvement. Today the theory is known, but much of practical value remains to be emphasized. Our investigations show that certain things should be done to improve the quality of air in sleeping rooms, especially. The air conditions in the farm homes are unsanitary, as a rule. Many places are found in which little attention is given to ventilation. The only system of ventilation, with few exceptions, is by windows and doors, which really is not a system at all. Several homes were visited in which three, four, or more persons sleep in a room with one window for ventilation, and that usually closed. Such a condition is harmful to health, for close confinement during the night, and breathing again and again of vitiated air tends to destroy rest, weaken the vitality, and increase the possibility of contagion. It is not difficult to understand why rural people house themselves so closely. During the day they are in the open air, and coming to the house, the close quarters and quiet air seem an agreeable contrast to the cold and wind. So the tendency is to overdo the matter. This should not be, for all people need an abundance of good air at all times. It is recommended that the windows be opened to let in fresh air, which is necessary for life. The night air is not harmful, as so many believe. There is more of superstition and fear in this belief than there is of common sense. Each sleeping room should have two or more windows. It is easy to provide against drafts by use of window boards. Drafts of pure air do little damage to health.

The average temperature in farm homes is too high in winter. Except in the presence of a very young child the ideal temperature during this season is about 69 degrees. Too high temperature, with low relative humidity, is directly responsible for some of the catarrhal and other troubles affecting the nasal and throat cavities.

In giving healthful air to the farm home, and for that matter to all buildings in which people are gathered, four things should be kept in mind:

1. Ventilation in which an adequate supply of fresh air is supplied for every occupant. This means four or five times as much as most people are now getting.

2. Temperature at about the right degree, not being too low, nor too high, especially. It is to be reduced in summer and not made too high in winter.

3. Humidity as near the normal for a given temperature as possible. Keep a liberal quantity of water evaporating on the stove in winter.

4. The introduction of an abundance of sunshine, the great natural disinfectant. It dries out the room. It may fade a rug, but it will assist in giving the right color to the cheek. Lift the shades, open the shutters, pull back the curtains and let the sunshine in. It is the symbol of life, as darkness is of death.

It is observed that not only do too many persons occupy a bedroom according to its size and ventilation, but that in some cases there is

extreme carelessness as to the cleanness of bed clothing. Its odor should indicate the need for washing. Agitation in the State for hotel sheets of a given size and free from dirt, as brought about by the traveling public, is a sane safeguard against the transmission of venereal and other diseases, and should meet with the commendation of rural people. Yet a more important movement for country and city alike would be a campaign of education for the specific purpose of improving the cleanness of the other bed clothing as well, some of which does not go to the laundry for weeks, or to the clothesline for air and sunshine, for months.

There is no good excuse for bad air in rural homes of our broad country. In the crowded city, however, where one or more families may be forced to occupy a single room, it is less possible to devise the necessary safeguards. The country, through neglect, is deceasing its vitality and leading the city only by a slight margin in its freedom from tuberculosis, which is traceable in considerable part to the quality of air breathed in the home, factory, and public buildings. The death rate from this cause in the country is about 136.6 per 100,000 persons annually; in the city it is about 198.3 per 100,000 annually.

An organized campaign for good air in the rural homes, schools, and churches of Nebraska and for sanitary water supplies would soon result in lengthening human life and increasing its efficiency.

Sanitary Food.—Much sickness in Nebraska is traceable to a poor quality of food. The State has a food and drug department which guards the quality, weight, and correct naming of foods. This department spends most of its time with inspection at places of manufacture and sale, requiring all unsanitary bakeries, dairies, stores, etc., to clean up or quit business. There is Federal inspection of animals and meats at the large stock-yards and packing houses. It would seem that all would be in full sympathy with State and Federal inspection of foods and drugs, but such is not the case; for frequent complaints and criticisms are heard, usually from persons representing selfish interests. It would further seem that no one would seek private gain at the expense of public health. Perhaps the worst situation of this kind at present is in the sale of habit-producing drugs. It is worth while for rural people to be diligently on their guard against the use of unsanitary foods, whether bought from the town or produced at home. Fruits and vegetables of the farm are usually fresh and clean. The meats may come from local slaughter houses or farm production without inspection, giving more danger than is usually supposed. On this account, beef and pork should be well cooked to kill tubercular germs in the first named and parasites in the second named.

How to keep fresh meat in the country is a problem because ice is not available at many places. As a result, cured and preserved meats are largely used. Eggs, usually fresh, and chickens make up for most of the drawback. In some respects the food supply of the country is more healthful than that of the city. Substantial articles of diet are used and not so many nick-nacks. Cooking is quite well done, but too little thought is given to food values, such as might properly be included in each meal.

In this respect the men, by their knowledge of balanced feed, show more practical knowledge in stock feeding than the women do for the family.

Not enough care is given to the milk supply in the country. The milk is fresh, but too often not clean. Sanitation in this line will develop as:

1. Milk is used from healthy cows only.

2. Cows are given good water, good food, and sanitary stables.

3. The milking is made clean in every respect. Through carelessness it may become polluted with manure and dirt from the cow's udder, the unclean hands of milkers, and dirty pails.

4. The milk is given sanitary care. This means clean, covered vessels, made so by washing and scalding; handling with clean hands; and cooling in the water tank, cave, or refrigerator free from the odor of decaying foods.

Milk is an ideal culture medium for the germs of typhoid, scarlet fever, diphtheria, and diarrhea.

Dish washing is carelessly done in many homes. Not enough suitable soap and soda are used to dissolve grease and other matter. Too often the dishes and silverware are not scalded to sterilize them, and the wiping is not always done with clean towels, also sterilized. In some homes the dishes and silverware used by one sick with a contagious disease are allowed to be used by some other person at the next meal without thorough cleaning. Such carelessness is nearly criminal. Food for an infant should never be chewed by the mother or other person before giving to the child.

Drudgery and Overwork.—The tendency among farmers is to decrease rather than increase hard work. This has advantages as well as disadvantages. There are few cases of overwork among men. Overwork is more common among boys and girls during the period of adolescence. A little more concern and thought by parents for this stage of development would give stronger and healthier men and women, for persons forced to work too hard during adolescence are apt to be weakened thereby and made more susceptible to disease.

Rural women sometimes fare badly. In fact, quite a few of them are overworked much of the time, even to the point of drudgery. This does not add to the strength of rural life, for overworked women are not capable of being the best possible mothers. In many cases the mother receives bad care at the time of a child-birth. It would be of great value to the health of our State if it were generally understood that the rural mother should be allowed to rest two, and preferably three weeks at such time before again taking up the regular routine of housework. Furthermore, neighbor women should not be allowed to bother her with useless gossip.

Rest, Work, and Play.—These are necessary every day in the life of rural people. In fact, the normal person rightly divides his time between rest, work, and play. This is true of both young and old.

Farmers believe in work, and rightly so, for by it they obtain the necessities and luxuries of life. Let it be understood, also, that work is a necessary process in the education and health of every individual. It is

largely by his own work that the education of an individual is made possible. The opposite of work is leisure, which impoverishes the individual and to that extent decreases the resources of the community. A leisure class is not productive, neither is it as healthful as a working class. The farmer has full opportunity to work, and therein lies a part of the secret of his success.

Play is necessary for rural people as well as work. It calls them away from the more arduous duties and makes them to be glad each with the other. It offers real fun and recreation, the lubricants of life. It makes people live longer, happier, and healthier. Too much play, on the contrary, at the expense of work and rest, makes people of little force and not capable of rendering much service to society. The one who plays when it is in order will live longer and do more work than others in the long run. There should be family play and recreation in the home.

Systematic rest, especially by the young, gives time for rejuvenation. The necessary sleep, an average of about eight hours a day, should be the lot of most people. Irregular periods of rest, as for example, that caused by too late hours, develops bad health and inefficiency, if carried to extremes.

The three great functions above named have about equal importance in the life of an individual, and are either directly or indirectly of value in the conservation of personal and public health. Too often the individual fails in his ability to rightly and sanely divide his time between rest, work, and play. His habits may lead too much towards development in one line. If so, one who goes to the extreme is regarded as being either lazy, a grind, or a sport.

Clothing and Exposure.—This topic has less importance in rural sanitation in Nebraska than most others. An increasing tendency is being manifested for the use of sanitary clothing, such as will not impair health. Examples of this kind are too numerous for discussion in this place. The underclothing should be kept scrupulously clean because it is close to the body. A rule of considerable importance might be observed by school children and other members of the family. It is that all wet clothing should be replaced with dry garments as soon as possible after the person comes indoors or is permitted to rest. It is generally agreed that wet clothing rarely hurts any one so long as he is actually moving about.

Exposure results mainly from quick changes in weather. If the government weather reports had a more general distribution in the homes and schools these changes would be known in time for use, and would be of value in so far as they are correct. Such information might be used more generally to enable the children to suitably prepare for school, and for the use of persons preparing for trips away from home.

It is believed that most cases of harmful exposure are due to freaks of weather and to thoughtlessness, rather than to deliberate imposition. An example easy to classify was brought to our notice last winter. It was in the northern part of the State, where a father and his son were in attendance at a farmers' institute and corn show. They bought a valuable

pigeon to the show. It was the proud possession of the father. Of course, this pigeon, with its beautiful and symmetrically developed leg feathers, won the prize here as it had at other places. The day was stormy; the pigeon was kept indoors and not allowed to grow cold. The boy, whose shoe soles were worn through, exposing his feet to the cold and ground, was caused to drive seven or eight miles through the blizzard to his home. Happily he did not freeze.

The rugged person can and should stand more or less hardship and exposure if necessary. There is a tenedncy, however, to overdo the matter perhaps in both directions—one in overanxiety and the other by neglect.

Sanitary Homes.—Country homes vary greatly in their healthfulness between those that are sanitary and those that are extremely unhealthful. The older houses were, with few exceptions, built according to custom and for size, without much concern for the health of the occupants. The newer houses evidence a marked change for the betterment of rural life. The latest advance in this line is an attempt to plan for each agricultural district in the State such types of houses as will most nearly suit the various needs. The houses are to be sanitary or as nearly so as seems practicable. Due regard is given to size and cost, to the number, size, and arrangement of rooms, and to ventilation, heating, illumination, water supply for drinking and bathing, sewage and garbage disposal. The house is properly located in relation to drainage, groves, outbuildings and lots, the object being to provide sunshine, protection against winds and dampness, and to avoid the odors from stable and family sewage. Furthermore, the barns, sheds, and lots are grouped in a way that saves time and labor in feeding and in doing other work. It is plain, therefore, that health and labor conditions are coming to receive more thought in planning new homes than do mere art and so-called beauty.

The first thing to do in making a new home is to plan it in all its parts. The second is to keep it clean. A clean home, well planned, is an inviting place. A dirty home with its darkness, dust, odors, and grease-covered cupboards, is not home at all. It needs fumigation, air, sunshine, hot water (boiling), soap, and scrubbing. Every house, whether poorly or well planned as to architecture, should be kept clean by daily attention and systematic cleaning. The clean home is necessary for public health, and rural communities should demand it of the few delinquents, even by law and inspection if necessary. Some houses, so called, are dark, damp, and gloomy. They cause sickness, crime, and death. A real rural house is clean, light, and cheery. It causes health and purposeful life.

Garbage is principally waste food, usually in the form of scraps. Included therewith may be trash and ashes, which should be disposed of in separate places. In no case should the garbage be thrown indiscriminately from the kitchen door onto the back yard, there to decay. The better way is to place it in covered cans, the accumulation to be carried to the pigs at regular times. The garbage disposal may include some of the kitchen

waters and most of the slops. The pig pen should not be too close to the house for reasons known to all.

Sewage includes wash water, animal manure, sputum, and the bowel and urinary discharges of people. Animal manure is a nuisance because of its odors, and in making breeding places for flies. Apparently there is no good reason for storing the manure in piles at stables and barns. Sputum is not usually given much thought in the average house unless it is from an infected person; it is then burned or should be. The habit of chewing and spitting on the part of men and boys does not add to the cleanness of the home. Bowel and urine eliminations are made at chance places about the farmstead, at the barn, in privies, enclosed closets, or in vessels in the house. Such elimination should be at as nearly regular periods from every person as possible. Lack of regard for this simple rule of hygiene, which is better than cathartics, leads to bad disorders. Human excreta should not be allowed to stand uncovered in the house. The safest way to dispose of the fecal matter from an infected person is to either disinfect it with chemicals or burn it. Otherwise its germs may be scattered by flies.

About ninety per cent of our rural homes have privies or cesspools, and these are nearly all unsanitary. A very good way is to so place cans in the privy that they may be removed and the matter taken therefrom and either disinfected and spread upon the ground, or, if not disinfected, buried in a safe place. Flies must be kept out of the privy for reasons yet to be given.

The excreta of most country privies is freely exposed to flies. The flies move between privies, the dining-room, kitchen, and the bed-room without much hindrance, at places. Such a situation is very dangerous because of the fact that flies deal principally in decaying matter, their feet being adapted for the carrying of such filth, including germs. In this way eliminations from the human body are carried to foods and consequently are eaten therewith. The fly is exceedingly dangerous in infected districts, where the excreta from tubercular patients, in the form of sputum, and of bowel discharge from typhoid patients, are not burned, treated by chemical disinfectants, or covered. From such places germs by the millions may be carried to the pantry or kitchen unless the food is shielded by cover or screen. The principal thing that assists in checking the spread of disease by flies in Nebraska is a lack of infection. It is evident that flies should be shut out of rural homes. Their presence in large numbers indicates filth. The necessary safeguards in the disposal of kitchen waters, slops, garbage, barn-yard manure, privy accumulations, and other decaying matter on the farmstead will check their breeding and thereby decrease the number. Most rural houses are screened to keep out flies and mosquitoes. Fly-breeding homes lose out in the struggle with only traps and fly-paper.

Mosquitoes are a menace in some homes in the State. They cause considerable discomfort, but are to be feared mainly as a source of malaria. Science has definitely proved that malaria can not thrive without the

mosquito. The easiest way, then, to guard against the spread of this disease is not by screens alone, but by destroying the breeding place of the mosquito. The following statements are said to be true:

1. "No stagnant water, no mosquitoes."

2. "No mosquitoes, no malaria."

Mice and rats should be kept out of the house and other farm buildings. The bubonic plague that gained a foothold in California was spread for the most part by rats. If there should be an outbreak of this disease in Nebraska it would be difficult to stop. The rat eats much grain and is of no use. It is nearly as filthy as the fly.

Home Inspection.—This should be for two purposes, one to note the condition of the home and the other to examine the health of the family. The time is quite sure to come when persons educated for the work will visit all farm homes at regular periods to consult with the people concerning sanitary conditions. Not only should the home be studied and kept in proper condition, but the members of the family should receive constant health care from some one. The head of the family must assume the responsibility of this inspection. He should be able to note a defect in sight or hearing, and to detect a skin disease or an ailment of the nasal cavity or of the teeth. Over eighty per cent of Nebraska's children of school age are said to be physically defective in some way. These defects hinder home and school work, and if not corrected by medical attention often lead to serious results. No child is at his best when suffering from a defect; neither is the parent. Such ailments affect the disposition of an individual and usually for the worse. A bad tooth may cause a quarrel between parents. Bad teeth in children of third and fourth grade ages may make them miserable and thereby affect the school deportment. Defective vision or a nasal impediment in breathing may retard a boy or a girl six months or more in school.

Good economy and proper regard for health demand that physical defects be treated as soon as they are detected, and that the treatment be done by a reputable physician. Next to the parent and teacher the physician is most concerned in the physical welfare of the family. It does not pay to delay in remedying defects. If, in the opinion of competent medical advice, a patient should be taken to the hospital for an operation, it should be done, as a rule.

Family Medicines.—Whereas a few remedies should be kept in the farm home for use in treating burns, cuts, colds, and the like, it is not deemed wise to indulge too generally in patent medicines. Practically all patent medicines advertised to cure any and every disease, especially those of a serious nature, are apt to have little or no value. They may work positive harm. Such preparations are made to sell rather than to cure. Some patent medicines, however, may be used with safety in the home. They are prepared by reputable persons or companies and for the purpose of treating specific ailments. The habit-producing drugs and medicines should be avoided.

Sanitary Schools.—The statements made in connection with the dis-

cussion of the sanitary home will apply in part to the school. The number of persons here is larger, however, and the possibility of disease-catching is thereby increased for every individual. The school is influenced by the family health. As a rule too little concern is had for school health, as is shown by a lack of sanitation in lighting, heating, ventilation, the water supply, and furniture.

The ideal exposure from which sunlight should be received into a school is the southeast, yet it comes from the west and even from the north in many buildings. As a rule not much thought is given to ventilation, with the result that children are rendered inefficient in their studies by bad air. In a few places the pupils drink in common from cups and buckets, but in most places fountains or other sanitary provisions are made. Rarely is the well cleaned or the water standing in it pumped out at the end of vacation before the new term of school begins. The furniture of the school is not, as a rule, suited to the size of the pupils, resulting in many abnormal physical developments, such as lateral curvature of the spine, sunken chests, etc. A state department is now making plans for rural schools. School boards should welcome the results of such unselfish work in which, without cost, each district can secure desired data as to sanitary school buildings.

It should be evident that miscellaneous spitting is more to be feared in the school than in the home, and that floors need scrubbing as well as sweeping. Also, that sweeping should be done in a way that prevents dust from rising. The best time to sweep and dust is at the close of school each day. Feather dusters scatter dust, and for this reason are less sanitary than cloths.

The schoolroom should be disinfected by fumigation after each case of contagious disease, and books used by a pupil with a serious contagious disease should be burned.

School Inspection.—This is for the double purpose of detecting the condition of the school and pupils. It gives to the teacher a definite knowledge of the physical condition of her students, which information has great value in school management. It often serves to show why a given pupil may be backward and thus retarded in his work. If the inspection could be done in cooperation with that of the home and with the full support of the parent, it would result in mutual benefit to the home and school. There are only a few places where rural schools are given careful inspection in our State. Many teachers, however, are learning how to give attention to this important cause. The school inspection of pupils is necessarily more complicated than that of persons in the home because of the greater variety of conditions.

Several beneficial results have come from school inspection in the towns of Nebraska. For example, a boy twelve years old was found to be backward in his work, and the teacher, in making inquiry for the cause soon learned that he had difficulty in breathing; the chest had become sunken and the body somewhat deformed. Other boys of his age were noticeably stronger than the defective one and could outdo him in all of

the games and contests. The examination showed that the defective boy's breathing was due to adenoids in the nasal cavity. The parents having noticed the ill effects, had done nothing for the boy, but upon the recommendation of the teacher took him to a nose specialist who removed the adenoids. Within a year thereafter the boy regained his normal health, increased in size and strength, trounced most of his playmates, and made up his back work in school. Other examples might be cited to show how physical health affects the progress of pupils.

Just what form health inspection is to assume in the home and rural school is not known. We only know that it is needed and that from the standpoint of conservation it would pay many times over in the long run. Our present method of habitual neglect is producing criminals on the one side and invalids on the other. Such dependents are natural products and very costly to the public.

Relations to Town and City Life.—Practically all country people go to town with more or less frequency. Too many of them go there permanently. The small town especially is an outgrowth of the demands of rural people for trading, church, social life, and vice. The small town in Nebraska is an index to the economic, moral, educational, and health condition of its community. The larger places become more specialized in business. They commercialize everything, including recreation and virtue. Such places are confronted with more health problems than the country and town, but by greater care, decrease the handicap. Good business in the larger towns and cities demands clean streets, healthful water supplies, and sanitation in the homes and places of business. By these and other effective means the death rate is decreased. In some places typhoid has nearly disappeared. Likewise diphtheria, tuberculosis, etc., are noticeably on the decline.

Many young people leave the country for the town. Their health and vigor are a distinct gain to urban life. A good many retired farmers with ungrown children go to town permanently. This often results badly especially for the children. Old men from the country do not as a rule know how to live in crowded places. They sit on boxes and counters, and talk much, but say little of value. They vote against town water supplies, sewerage, etc. The children, having no regular duties, drift into habits that would put the town boy to shame. The average farmer should retire on the farm where he can best live.

The following suggestions are intended to have importance for rural people while in the town or city:

1. Do not drink water from a well located too close to a source of pollution. Some small towns have no public water supply, but secure drinking water from many wells badly located. In fact, the house, privy, and well are placed on a single lot as a rule.

2. Do not eat figs, dates, and other fruit exposed to the street. They are apt to be covered more or less with small particle of manure and many germs that have come from the street and the sputum of the walks. Flies and air currents are carrying such material to fruit stands and stores and

thereby contaminate the food that is exposed. Apples are in some cases polished by fruit venders using spit and the sleeve. Lemonade and popcorn may or may not be clean.

3. Select a sanitary place in which to secure a meal. Let the food be wholesome rather than dainty. A little observation will show that most restaurants are quite clean, yet there are a good many in which the environs at the rear of the buildings are dirty in the extreme. Do not eat in unclean places. It is good economy in the long run to patronize moderate priced places, not the cheapest.

4. Select a hotel with considerable care while remaining in a city, especially so if not acquainted. Most of the high priced places are safe, both as to sanitation, fire, and morality, but some of the cheaper places, especially those advertising "rooms to rent" are positively bad. Never use a dirty towel.

5. Do not become an habitual loafer in town. Many farmers develop the habit and transmit it to their children. It is better economy to go to the town for business or other helpful purpose and to return home soon or early. Purposeless loafing leads to neglect of farm work and usually to the loss of the farm. The town has provided places to hitch teams, but no rest rooms for people. Such a place is very much needed for the women and girls, for they are now required to walk the streets or stand around in the stores till the men are ready to go home. The ill-effects resulting from this neglect are more marked than is usually supposed. Let the country people share the expense of a rest-room. Some have suggested that the churches might be thrown open for this purpose.

6. Drunkenness should be avoided. It does not add to the dignity of a rural community. It decreases human resources and degrades a community's health and morals.

7. Avoid immorality while in the city. The results of carelessness in this direction are evident at thousands of places in the country, as shown by persons suffering from some of the worst diseases known to man. Our survey has, through hundreds of sources, been enabled to gather definite data to show the effects of the social evil on country people. The fact is that the worst contribution from the city to the country is the diseases contracted in this way. Let it be known also that the country should assume its full responsibility in the regulation and control of this great problem, which results, in considerable part, from the demands of rural life. Many persons who have given serious and careful thought to the problem are of the opinion that the present State laws governing the social evil are defective. They claim that the public health is suffering more than it would if the evil were segregated and rigidly controlled. Be that as it may, many practicing physicians report an increase in the social diseases. Just what measures will ultimately be taken to rid society of immorality and the bad effects connected therewith is not known. One thing is sure, namely, that the subject must be handled primarily from the standpoint of health and its conservation.

The Promotion of Health Through Education.—The length of human

life is increased about in proportion as the people are educated to live clean lives physically and otherwise. Where ignorance and superstition are most in evidence there also are contagion, disease, degenerates, and short life. Certain it is that our system of public education has been a great factor in conserving the health of the individual and society. It may be said that public expense for the education of the youth is justified many times over in that it decreases criminality, develops health and morality, and trains for service. No one will question the fact that bad health is a cause of crime. Furthermore, ignorance causes poverty, crime, and sickness. Our greatest safeguard, then, will be in the education of the youth for proper living.

The following copies from an address by Dr. R. H. Wolcott, Dean of the Medical College of the University of Nebraska, plainly show the importance of education along the lines of health conservation. Therein is also outlined the position our medical college is to assume in preventive medicine. Dr. Wolcott says:

"It is a matter of congratulation that education today is becoming constantly more practical. We are training our boys and girls more and more for the business of living, and living so as to be efficient members of society. Courses in hygiene and sanitation should be in every school, and the country schools need such work as much as the city schools, or more.

"Not only should the people be taught personal hygiene and be made to understand the importance of keeping themselves clean, but they should be taught community hygiene or sanitation, and made to understand the necessity of keeping the surroundings of the home and the community clean. Science has taught us not only that disease germs swarm in filth of all kinds, but that insects which abound about us are the means of transmitting those disease germs to us directly by bites or indirectly by transferring them to food or other objects we put into our mouths or bring in contact with our bodies. Flies breed in filth, carry filth, and disseminate the disease germs in filth. Mosquitoes transmit malaria as well as other diseases. The amount of malaria usually found in a new country is due to a lack of clearing of the land and deficient drainage of surface water. But ponds do not breed most of the mosquitoes which trouble us in our homes, for in ponds fish and other animals serve to keep down the numbers. On the contrary, they are mostly reared in rainwater barrels, in old casks and cans partly filled with water, in unused wells, and in other places about the house where, free from the attack of enemies, they breed in swarms and develop in a few days after a rain or during rainy weather.

Not only is it desirable that there be instruction in the schools in these matters, but it is highly desirable that communities, even farming communities, take means of informing themselves on these subjects. There ought to be meetings of the people addressed by physicians and others who can explain these questions to the community, and in which the conditions may be thoroughly canvassed and measures taken to alleviate those which are unfavorable. Particularly should communities every-

where uphold all duly constituted health officers, including the local and state boards of health. Usually only the existence of an actual epidemic can arouse public opinion. How much better it would be if public opinion could be so educated as to make it possible to prevent the epidemic.

The greatest development in the field of medicine today is in the direction of protective medicine. The great research laboratories are everywhere studying the problems of how to prevent disease, rather than how to cure it. The strongest argument in favor of the maintenance of State schools of medicine lies in the fact that in such schools the faculty, paid by the State, must of necessity feel an individual responsibility to the people of the State, and their time outside of their teaching work will be devoted, not to private gain, but to research into the cause and nature of the diseases found within the State, in order that such knowledge may be turned to the advantage of its citizens. At the same time the students graduating from such a school should be made to feel that they have a debt to the State which has provided them with the means of securing their professional training, and it can be confidently expected that from such a school will come doctors better trained and more disposed to lead in the field of health conservation than those who come from privately endowed institutions. The medical college of the State should also take the lead in the education of the public to understand these matters and to appreciate the value of highly trained medical service. In common with the medical colleges of other state universities, the medical college of this State is looking forward to widened activities in these directions, and to a larger share in the great work of health conservation among our people."

Strong ideals, backed by resistless purpose, play an important part in health conservation. They become real forces in boys and girls, who are full of life, wanting to be strong, active, and successful. Such young people are ready to pay the price of success in well-directed effort if they have strong leadership. Let the parents and teachers see the importance of purposeful living on the part of young people and endeavor to guide it to its fullest fruitage. Let the lessons learned in the selection, breeding, and care of farm animals apply in the main in the conservation of people. If the young people are learning how to grow premium corn, prize winning cattle, and the like, why not also emphasize the ideal boy and girl? In other words, the knowledge employed in growing better crops and healthier animals, in which so much attention is given to the prevention and eradication of disease, may have even more importance in the development of people. It should cause young people to be more purposeful and to want to do right things rather than to yield to degrading and unhealthful influences. A spirit of this kind would promote the cause of health if it could be more generally developed in the public schools.

Disease Prevention.—Most rural diseases result from causes outlined in this paper. They do not simply happen in mysterious ways outside our control. To a very large extent diseases are due to sinful living in violation of the laws of health.

The principal way therefore for farm people to prevent disease is in clean living. When this is done in its fullest measure there can be no contagious diseases. Proper habits of work, eating, and elimination would prevent most other diseases. It would seem, then, that every one would be on his guard, trying to prevent sickness, rather than to experience disease with its uncertain cure.

It is to the very great credit of the medical profession that its members have led in this great movement of prevention. Certainly it means less sickness and consequently less practice. Let the parents and teachers accept their part and responsibility in making use of known preventive measures in the home and school.

It may be said that heredity has much to do with disease. So it has, but the cause in such cases is only a little further back, perhaps, in the parent. Prevention on the part of one generation will affect the heredity of the next. Viewed in this light, it is easy to see our health obligation to future society, and that the stock or strain of breed of man can be markedly improved through prevention. Just what legislation should be enacted to prevent the marriage of unfit persons is not fully agreed. We face the fact that the union of feeble-minded persons or of other degenerates is most destructive to society. It decreases health and causes the human stock to run down. The penitentiary and insane asylums of our State have many patients whose criminality and condition of ill health can be traced back to particular preventable acts that gave them preventable disease. We refer now to certain diseases easily avoided, but practically incurable when contracted. Their spread is due very largely to immorality, the control and prevention of which present the largest conservation problem of this age.

CONSERVATION OF BUSINESS.

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Conservation stands for the right development of resources viewed in the light of public welfare. This idea of equity has permeated every department of industry. It was first directed towards the resources of basic importance, such as coal, iron, soil, water power, and the forest. Soon the major emphasis shifted as the notion that all useful plants and animals as well as man came to be regarded as natural resources. The last, and in some respects most important, move in conservation was the extension of its principles to business, not for the purpose of holding business in check, but primarily for protection against fraud. Such a development is badly needed in most states, for fraud is tracking legitimate business at every turn. Furthermore, business is shot through and through with petty graft. It is sore with deceit, trickery, swindling, and even theft. This should not be, for the name "business" stands for honesty, good faith, integrity, honor, stability. Plain it is that many transactions in the world of commerce fall outside the realm of true business. They grade from dealings that are only apparently criminal to those that are plainly so.

The different lines of business are conserved in many ways. This applies to practical developments in improving the processes involved in handling commodities all the way from manufacture to sale; to trade, in the direction of economy in buying, transportation and sales; to doing business more economically in stores, by increasing the efficiency of help, protecting the wares, and looking after collections. It is bad business for a town to have too many stores for the amount of trade, causing undue expense for store-room, heating, lighting, and help. Such does not conserve the interests of either the business man or the public. Much talk is heard about cooperation between town and country. This is well founded, for it gives strength and harmony to business. On the part of farmers, poor cultivation, careless handling of stock, buying on time, etc., should be regarded as bad business. Poor schools, too many church buildings, badly kept roads, unclean streets, and grafting officials are evidences of bad business on the part of the public. So there is room for practical conservation in many lines of business. It will prevent waste, improve efficiency, and thereby decrease the cost of commodities. A more general movement of this kind would promote real business and work a public good at the same time.

It is not the function of this paper to recite at length any of the methods whereby system and efficiency are developed in particular industries. The purpose is to review certain classes of fraudulent promotion that are operating under the guise of business. Such fraud is manifest in forms of cheating, double dealing, doubtful promotion, and purposeful swindling in various enterprises, as in mining, irrigation, drain-

age, land dealing, fruit raising, etc. The following discussion is based on reliable statements secured from farmers, merchants, land men, loan agents, bankers, and others. It is in part the result of a definite field survey.

Mine Promotion.—The amount of money sent from our State, apparently for the purpose of developing copper, gold, silver, lead and zinc prospects in other states, is enormous. The return for this has not averaged one cent for each dollar invested. It might be well for Nebraskans to recognize the fact that nearly all sure propositions are not available for promotion. In the language of a practical mining man, "Persons on the ground look after all good deals; the others are fit only for promoters. Furthermore, a mere prospect is not a mine."

Oil and Gas Promotion.—Perhaps no excitement causes one's gambling spirit to rise higher than does that of a developing oil field. At such times everything looks good to the public, and fabulous returns appear to be in sight for all who invest in time. This gives opportunity for professional promoters to get in their work, sometimes on a large scale. It is difficult to show the criminality of such procedure, for it is necessary to prospect nature's hidden treasures. Locally, then, it may be a good service in certain places for persons to put money into wild catting. This proves or disproves certain things. Professional promoters do not work in this way; they have a sure thing, so they claim.

Let it be known that most of the money sent from Nebraska for investments in oil regions has been lost. It has gone to promoters and for wild catting, and not for developing proved territory. It is not good business to accept the unqualified statements of most oil and gas promotion concerns as a basis for investment.

Irrigation Schemes.—The Federal Government has expended a vast sum of money in developing the irrigation resources of the various dry land states. This is thought to be reclamation of economic importance. Furthermore, many reliable individuals and private companies have done as well or even better in developing some projects. As a result of irrigation development thousands of happy homes are now located where once was only dry land. Notwithstanding this fact, there has been much fraud in irrigation promotion. Scheming individuals have sold illegitimate propositions in which there was no show of success because of a lack of water, unsuitable land, or heavy graft. Nebraskans have invested in many irrigation prospects outside the State. Fortunately, however, most of their money has gone to successful enterprises. In a good many cases it has been invested in the stocks of concerns than can hardly hope for success.

Drainage Schemes.—One of the largest lines of improvement awaiting development in the United States is in the field of drainage, whereby swamp and flood lands are brought under cultivation. The amount of land that either has or can be improved by drainage is said to be about 75,000,000 acres. The Federal Government, various states, companies, and individuals, are doing this reclamation. Much of this development is well

founded, yet there are parasites in the form of graft and bad deals, which might be called deliberate steals in some cases. Examples of such are known to exist in a few states. Perhaps the most striking one, however, is in Florida. Much Nebraska money went there, and a considerable part seems to have been squandered on projects than can never succeed. Teachers, ministers, farmers, and many merchants have been victimized. In the language of one of Florida's representatives at the National Irrigation Congress of this year, "Persons selling certain wet lands of Florida are practicing fraud and should be prosecuted as criminals. They are hurting the good name of Florida and swindling people in the North. Comment is not necessary. There are good propositions in Florida.

Land Schemes in General.—There are many other land projects beside those of irrigation and drainage. The public has invested very largely in small tract propositions in Florida, Texas, and other states. Some of this land has considerable value, but most of it has been over-estimated, and many investors are quite apt therefore to lose all or nearly all of their money. The country being smooth and attractive causes the average farmer or person from the city to attach more value to the land than it really possesses. Also it may look more inviting at one season of the year than at another. For instance, there are places in Texas to which the agents take their victims in the dry season, and to other places during the wet season. The writer heard a Texas representative declare in a national meeting than many of the small tract propositions, together with certain land schemes of his state, were filled with fraud. He criticized northern people for thus promoting Texas. This should serve at least as a warning to Nebraskans. There are splendid agricultural propositions in Texas, but they are not handled by the average promoter. They are placed on the market by responsible land agents.

Dry Land Deals.—The dry land deals of the United States and of Mexico have not been free from fraud, caused in part by misinformation on the part of agents, but due more largely to deliberate misrepresentation. For instance, there are places in Texas, Oklahoma, Kansas, Colorado, western Nebraska, Wyoming, and other states subject to such promotion. The fact is that a part of the land in the dry area of each state named is well suited for dry farming, but that unscrupulous agents sell anything and everything to unsuspecting persons are being good, awaiting the plow and successful development. So it is that geographic position has been overworked in the land business. The following points have been overdrawn.

1. The argument that most agricultural land is under cultivation.
2. The notion that dry farming methods are successful on almost any kind of soil. Such is not true.
3. That the climate, referring to the rainfall especially, is becoming more favorable for agriculture in dry regions as the years go by. This notion, used in deceiving thousands of people, is greatly in error.
4. Another condition has been a cause for much misunderstanding and a considerable amount of temporary development by periods. It

comes from the fact that the amount of rainfall fluctuates at more or less regular periods, ten to twelve years apart. During the wet years everything is boomed; at dry times the reverse occurs. Reliable information concerning the fluctuations of climate would be worth millions of dollars to Nebraska in conserving its industry. Rather careful study is being directed towards this problem.

Misrepresentation and Overvaluation.—Not only do certain promoters misrepresent specific propositions for the purpose of receiving gain therefrom, but in many cases they advance the sale price unduly. An example of this kind was brought to the writer's attention a few years ago when he was asked to examine a large tract of land in Mexico for bankers in Nebraska. They were to buy the tract for a little less than $1 an acre, if the land proved to be suited for colonization, the purpose being to dispose of the land to Nebraskans. My report was adverse both as to the land and the scheme. Later, a concern operating from a city in a neighboring state purchased the place and sold it to Nebraska farmers at from $10 to $20 or more an acre. The farmers and townspeople who went onto the land, as they have done in many other similar places, lost out. Those victimized said hard things about the promoters, the city, and Mexico. Nebraska lost several citizens and much money in the deal. Such a thing would have been prevented if we had a law for the conservation of business against such procedure.

The public craze for land has made it easy for promoters to do their work. Many farmers, dominated by a spirit of consideration for their children and believing the dope of the promoter, sold the old home places in agricultural regions and moved onto nearly worthless land, with the assurance that it would become about like the agricultural land in time, and that each child would then have a farm. Such a deal is criminal. Certain railroads are not free from blame. Let it be known that mere belief, opinion, and sentiment are not strong enough forces to overcome the influence of land nearly worthless for agriculture. The farmer who accepts the bad dope is also to blame. The time is sure to come, however, when the arguments that now seem to hold for land developments in general will not be regarded as having much value in a particular transaction, for facts concerning the land in the deal will be demanded.

Reliable persons who have at heart the best possible development of their states stand strongly against misrepresentations whether unintentional or not. Doubtful promotion serves only in closing land deals, and in directing settlers to the land, but in the long run the process works a positive harm to the misguided people as well as to the state if the land is not suited for habitation. Fortunately, there are few doubtful land promoters in Nebraska. Some states do not stand so high in this respect. We have learned that it pays to tell the truth when it comes to transplanting a population.

If the Federal Government had made a soil survey of its domain ahead of settlement and development, it might have been used first to direct the homesteaders and later as a basis for land transactions. Such

survey would have cost about as much as a single battleship. It would have been a constructive influence of great value.

Fruit Land Promotion.—Thousands and thousands of dollars of Nebraska money go to the fruit districts of the West and Northwest. The investors see visions of fabulous returns. Some may do well on their investments, yet we are convinced that there is more excitement than solid fact in at least a part of this promotion. The leading fruit man of the northwest, one directing a large enterprise, told the writer that not half of the so-called best projects could succeed. Let this be a warning, at least to persons who have money to invest in fruit land of other states rather than in southeastern Nebraska. Some of the projects are sure to succeed and to give good returns on the money invested therein. Many of them never can succeed, for they were started without due regard to soil, exposure, markets, etc. It so happens that the propositions handled by promoters are the least sure, and that they receive investments on the part of the general public.

Eucalyptus Promotion.—For many years the forests of the United States have been in process of depletion. Some have seen in this, and with good reason, an approaching timber famine. The alarm has been sounded, and the demand has gone forth for better methods in timber utilization, for fire protection, and for tree planting. This is the right thing without doubt, but it affords a loop-hole for promotion. Let it be understood, also, that some trees grow faster and are more all-purpose than others. The eucalypts are of this kind. They are of many kinds. Such trees can not be grown on any and every type of soil and are limited somewhat by climate. It so happens that California, because of its soil and climate, is the leading state in the culture of eucalypts. It has several successful groves and larger plantings, yet the situation is worked for all it is worth and more. Perhaps a majority of the propositions are bad. The public is worked according to several plans or selling schemes. The fact is that there is too much graft in most of them. In some cases only prospects are promoted. The process has gone on to such an extent as to attract the attention of many prominent Nebraskans, especially while in California. Several of these have looked into the eucalyptus business with considerable care. They report much fraud. It would seem, therefore, that Nebraskans should be cautious in this line of investment for it may not be good business. The tree must have suitable soil, climate, and care.

Promotions and Local Industries.—There are many examples wherein scheming individuals take advantage of an unsuspecting public, usually in a small town, for the purpose of getting hold of capital through the guise of starting an industry, such as a brick plant. The people are invited to invest, they do so because of the attractiveness of the proposition as laid down by the promoter, but fail to inquire into the responsibility of the person who collects their money. In most cases of this kind, and there are several in which $20,000 or more was taken from a town, the larger part of the subscriptions went to the promoter and the

industry was not even started. Local enterprises in their inception should be looked after by commercial clubs or responsible local men. The term promoter as here used is not intended to apply to enterprising, public-spirited individuals who organize a legitimate company.

Promoters' Methods.—Many plans are devised for securing money from the community. In the first place a selling scheme is perfected. It is constructed in a way that leaves no flaws, apparently. Each agent learns the dope to perfection; he tries to become expert in applying it to the different types of individuals. Too often, it is of little concern whether the project has merit or not. The chief object is to get money. Extravagant claims are made, in which returns of even 100 per cent or more a year are said to be a sure thing. The influence of nationality, church, and fraternal order may be brought to bear in securing sales. In this connection the person who assists the promoter is perhaps given a reduction or some rake-off for his influence. The dope is given him often and systematically. So he is soon able to realize the greatness of the project. This is promotion psychology. Shares, stocks, etc., are offered at a high enough price to permit reduction for quick sale, which bait works in many cases. The above kind of thing has been practiced in most communities of Nebraska for years, and the wonder of it is that it can continue and why the State should permit it to continue. It is time to call this so-called business by its right name, which is fraud. It should be stopped. Many towns have lost $20,000 a year; McCook reports a total loss of about $1,000,000; Lincoln and Omaha have been centers of promotion. The State loses $3,000,000 or more a year.

Effects of Fraud on Business.—Persons who lose in illegitimate propositions are apt to become suspicious of reliable business, even that done by men well known in the community. Furthermore they refuse to put money into local developments in which the returns are sure, though smaller, than those promised by promoters. Persons with money to invest should be attracted more by propositions that can insure 8 per cent than by those that promise almost anything. Local propositions are backed by responsible men as a rule, whereas the others may be supported only by the statements of irresponsible persons. The one is close home where you can manage it, and the other is distant, perhaps at the end of the rainbow. In one you get an interest, in the other a promise to deliver an impossible thing. The drain is away from the home, school, State. Perhaps the greatest loss of the State is the people who are lured away to places where they are, in many cases, less well off than in Nebraska. Many are put out of business entirely by fraud.

Regulation and Supervision.—Business embodies transactions in which the dealings are done on the square. It is dominated by honesty, good faith, integrity, and honor. The sooner we emphasize the real spirit of business in all transactions of the individual, the community, and the State, the better it will be for society. The demand then is for business and not for misrepresentation and fraud, which are but parasites. Let business demand protection against fraud. Protection is needed in the

form of a law that will promote real business and minimize fraud. Such law should not have as its primary purpose the holding of capital at home. This should be the second purpose. The main object should be to conserve business.

Though our State has led in the agitation for conservation of business, Kansas has gained prominence in enacting an effective measure in the form of the well-known Blue Sky Law. We will do well to pass such a measure with a few modifications. That the State is ready for such a law is evidenced by the very general interest in the subject. Most state meetings of farmers, merchants, and bankers held during the past year passed resolutions favoring a measure of this kind. Several of these organizations appointed committees to work with the director of the conservation survey in framing a law for conservation of business. The movement for square dealing is quite general throughout the United States. Apparently several states are to enact laws along this line as soon as their legislatures convene.

The following points should be provided in framing the law:

1. Title and purpose.
2. Outline of the business regulated and supervised.
3. Examination and passing upon the validity of concerns seeking to do business, noting their showing as to incorporation, by-laws, officers, kind and place of business, financial condition, etc.
4. Registration and certification, perhaps by the banking board. The State should not guarantee. It should only evidence the fact that the concern has made the proper showing.
5. Regulation and control by the banking board.
6. Field examination of the properties, stocks, etc., offered for sale, if called for by a citizen or would-be purchaser. This might be done by the conservation survey working with the banking board.
8. Penalties.
9. Fees.

There are several laws for the conservation of business. We now need a special act against doubtful promotion. This is nearly unanimously agreed among farmers, merchants, and bankers. None oppose the measure openly, and there is not apt to be opposition before the legislature unless it comes from persons who make gain through graft. In this connection the opposition, if it shows up, will have the embarrassing situation of appearing on the side of fraud. No legitimate concern need fear such a law.

In its practical operation the act would be nearly self-operating if properly administered in the beginning, for only reliable parties would seek registration. The others, knowing the law and that they could not comply with it, would not apply. Nevertheless, due care should be exercised in framing the act to make it just, fair, and workable.

THE RURAL SURVEY.

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The agricultural survey is coming to be a function of most states. Why, and what are its relations to other surveys? This paper will attempt to answer these questions.

What influences affect the rural development of a state? Of these, which are fundamental and which are secondary? The problem of the rural survey is to discover these influences and to evaluate their importance.

The inventory in business has long been recognized as essential. Likewise that the correct accounting of receipts and expenditures is necessary to success in business is universally admitted. But until the last decade we have not, as a people, recognized that the same methods must be applied to agricultural pursuits. There is now a demand for the rural inventory along many lines as shown by soil, horticultural, farm management, special industrial, social, and educational surveys. Still others could be named. The results of these special investigations may have considerable value, if the rapidity and unscientific spirit which sometimes characterized the work does not lead to wrong deductions and grave errors. The scope of such surveys is not fully agreed. Neither is there agreement as to methods of doing the work. In some of the so-called surveys questionaires are sent to a chance collection of names; data thereby collected are tabulated and deductions are made. As a rule such procedure gives little more than an opinion. It seems, therefore, unwarranted to base a survey on the questionaire alone. The statistical method appears to be over-emphasized on some surveys. We do not wish to discourage the gathering of agricultural statistics, but we do mean to say that the average statistical data are not fully reliable, and they only express the agricultural practice. There is more to a survey than figures. Back of the figures and rural activities are the conditions which control them. To these we must go for basic facts which determine the agricultural practice, the amount of production, etc. It seems, therefore, that our rural survey should be made by personal work on the ground—in the field, farm home, and country town. Here the person doing the work sees success and failure sometimes side by side. He first becomes a student and later a teacher. He learns real facts, not fanciful notions, selecting what really have importance. There are many state surveys. They usually work along separating lines rather than through cooperation. The rural survey is more comprehensive. It uses the results of other surveys when available. It emphasizes the fundamental influences effective in agricultural development. No rural survey should be started because it is the custom. The work must be purposeful and useful. The view-point of the State is to be kept in mind, and survey facts are not to

be distorted by sentiment or prejudice; otherwise the results may be misleading and worse than useless.

The question arises, what facts are of fundamental importance? Recognizing that certain influences are basic, it behooves us to attempt to learn what they are. For Nebraska we must know definitely the life and industry of the commonwealth. In brief, we should appreciate the geography of our State, the reaction between life and natural conditions. It is the province of this paper to point out these fundamental controls. The factors here outlined are emphasized in the Nebraska surveys. They were presented at two annual meetings of the National Association of Conservation Commissioners, and represent the unanimous opinion of those bodies. In the movement for a fundamental basis of investigation, Nebraska has taken a prominent part. The subject is now introduced by asking a practical question, one that comes to every person who seeks a home in another state or country. What would such persons ask about the country? The inquiries would be in regard to the things that affect the work, health, and success of people—the favorable and unfavorable as well. If we could tabulate all the questions concerning the new home they would be found to refer principally to structure, topography, drainage, local climate, ground water, soils, and the native life of the region. The inquirer would also desire to know something of the social and industrial conditions if the region is settled. We do not maintain that an agricultural survey should undertake to cover the whole field of investigation concerning these points. It should use the facts gathered by the physical and biological surveys, evaluating their importance. We will review some of the relations that exist between rural development and the controls above named.

Structure.—By structure is meant the underground make-up of a region, the kind and arrangement of the materials of the land. Structure is directly related to mineral resources, topography, water supply, and soils. It determines the kind and availability of coal, building stone, clay, sand, etc. Geologists do an important work in describing and mapping the structure of the land. Too often rural people do not realize the fundamental importance of this survey.

The water supply and soils vary with the geological formations. Sand and sandstone formations usually contain good water, but the soil is likely to be deficient in fertility. Limestones yield hard water, but the soils will probably be fertile and valuable if deep enough. Shale land yields very little well-water, usually of bad quality. Where the shale is very deep, storage of rainwater in cisterns and reservoirs is necessary. Shale land is likely to have a heavy gumbo soil, one that is slow, cold, and hard to work.

It would seem that every farmer would be in favor of such geological surveys as accurately determine the structure of the state, for this information is of use for many purposes, especially in soil studies.

Topography.—By topography we refer to the surface features of the land. These features are caused by wind, running water, etc., modi-

fying the land. Topography is so closely related to structure that one acts as a key to the interpretation of the other. The harsh, hummocky surface of granite regions usually differs from the gentler slopes of the stratified areas. The surface presented by slightly covered rock slopes stands in clear contrast to that found where there are deep mantles of looser materials.

Topography controls the location of railways and canals. It should also be considered in laying out rural highways. The system of road-building which insists on roads along section lines, regardless of distances or slopes encountered, needs to have its view-point challenged. Roads should be built for comfortable travel and not to mark the boundaries of farm units. At present many farmers are retarded in marketing grain because of a few unnecessary high grades between the farm and town. Farming is mostly on smooth or rolling land. The rougher areas are given over more to grazing and the forest. In this we see the relation which topography bears to the use of land.

Farm homes should be planned with respect to topography. This will consider drainage, direction of exposure, and accessibility of good roadways to markets. Roads planned according to surface slopes would also lead to convenient location of homes.

Cities are built along great highways, which are controlled by topography. Lands not located near great natural highways must be provided with the best roads possible to connect them with the distant markets. These roads should avoid unnecessary curve and grades. The building of such roads according to topographic controls would eliminate useless toil in delivering products to the markets. This would mean increased prosperity for producers and consumers alike. The United States has spent large sums of money for topographic mapping for army use. Certainly agricultural interests deserve even geater recognition. Can there be any question that rural development demands that the surface of the land be accurately mapped? About 40 per cent of Nebraska has been so mapped by the United States Geological Survey. The State is now co-operating in this work, which is to be completed as fast as funds are available. Topographic maps are necessary for field work on the other surveys. It is of value to a state for its citizenzs to have access to authentic descriptions of its types of topography in which is shown how the land forms were developed by the various natural agencies.

Drainage.—Another fundamental factor in the development of a state is its drainage. The type of drainage is related to rainfall, topography, and the texture and structure of the land. It is of importance in erosion, water power, and sanitation. Smooth land under low rainfall has little run-off. Rough land tends to drain more rapidly than smooth. The relations therefore of topography and drainage are very close, both as to cause and effect. Open textured soils and subsoils give relatively more drainage to the underground than to the surface.

Stream utilization for power is dependent on constancy of flow as well as volume. This calls for gaging extending over several years. In bridge

building and drainage work a knowledge of the maximum volume of a stream is essential. Many bridges have been built too small and great damage resulted because of lack of data. In irrigation the minimum should be known so that necessary storage facilities may be provided or the amount of land to be irrigated limited to available water.

The amount of run-off on agricultural land should be known because of its relation to rainfall, soil wash, and erosion. Soil wash depletes fertility, and erosion carves many Nebraska farms into remnants separated from each other by nearly impassable gulleys. In some places erosion is being prevented with fair success, but the various ways of checking it are not generally enough known. To this problem the survey idea should be applied so that the success of the few may become known and the means of success placed within reach of many.

Drainage conditions in irrigated districts have not always been understood by the settlers. This is responsible for many failures. It is the duty of the State to study this problem in connection with every irrigation enterprise within its borders and to place accurate, unbiased information within reach of its citizens. By so doing it will minimize the danger of failure and increase the probability of success. That means real development.

Nebraska is sometimes considered a dry state; nevertheless it has several thousand acres of fertile wet land. The streams of eastern Nebraka generally have meandering courses in broad valleys. These flood-plains are regions of great fertility, but they have been poor producers because of overflow of the streams at times during the growing season. Some of this land is being reclaimed by ditches and straightened stream channels, and more could be improved. These flood-plains should be mapped and accurate data gathered as to their conditions. Such data are of use in reclamation.

It is not generally known that Nebraska has a good many lakes, probably five hundred or more. Many of them should be drained. Which? Some may be utilized for fish and game production. Which? Some may be developed as potash producers. Which?

The state's should accurately map and describe their water features, such as streams, lakes, bays, and marshes. Such information is of use in irrigation, drainage, navigation, fish culture, city water supplies, etc. The location of water features is shown on topographic maps. The hydrographic department of the Government is studying surface water features, having published many bulletins thereon. This work is of value to agriculture.

Local Climate.—The influences of climate are common talk among farmers. The elements—temperature, sunshine, wind, humidity, and rainfall are recognized. The United States Weather Bureau is doing a splendid work, yet more than general ideas is needed. This fact is recognized in fruit districts especially. The need there is for a knowledge of local climate, even that of the farm or certain parts of it. The climate of the soil is coming to be regarded as having even more import-

ance than that of the atmosphere. Herein lies a new field of study. Soil climate varies with slopes as to direction and steepness. How much warmer will the soil on a south facing slope be at stated times than the soil on a north slope? Will the soil on a steep slope warm up more rapidly than on a gentle slope? How will the climate of a sandy soil differ from that of a clay soil? How will these differences affect crops and the selection of seeds for such crops? These are questions which should receive consideration in a rural survey. The planting of orchards and ornamental shrubs should be based on such data as are implied in these suggestions.

It is a well-known fact that the amount of rainfall is no more important than its form and distribution. When is precipitation most abundant? This question answered means that crops adapted to such distribution can be selected. Does the rainfall have a tendency to be violent and of short duration, or steady and prolonged? Are hailstorms frequent? Are the rains usually accompanied by heavy winds? The modern idea is not to accept general statements but to determine climatic data, accurately to local areas, even to specific farms in so far as it is possible. The elements of local climate factor very materially in agricultural development and must be recognized as fundamental influences.

Ground Water.—Rural investigations sometimes overlook the importance of the water in the ground. This water has value because it serves as the source of crop water and usually also as a supply for man and beast.

There are two zones of ground water. The upper is where the spaces between the earth particles are not completely filled with water. This is called the capillary zone. The lower is where the spaces are completely water filled. This is termed the saturated zone. The upper limit of the saturated zone is known as the water table.

Ground water is related to structure and topography and affects soils, plant and animal life, and the desirability of regions for homes. If the water table is too far below the surface and the soil texture open, drouth conditions are likely to prevail and drouth resistant crops must be relied upon. If the water table is too near the surface, opposite conditions are true, but then the handicap is almost as serious, for the best crops will not prosper if the upper subsoil is water-soaked.

The depth and character of the wells in any region is dependent on groundwater as well as rock structure. Where shallow wells are used what is true of the quality of water? Are they located up-grade from cattle yards and other sources of contamination? Are they well graded so as to prevent entrance of surface run-off and resultant pollution? The water supply of any region is one of its important features. Where easily obtained and of good quality it furnishes a very valuable asset; whereas if difficult to obtain or of poor quality it means a serious disadvantage to the development of the district involved. The desirability of farms for homes is directly related to the water supply conditions.

In the rural survey the various phases of the groundwater problem should be investigated. The amount of water held by the soil is even more important than the quantity of rainfall. The depth to the water table is a leading factor. The quantity, quality, and accessibility of well water for any region must be considered of fundamental importance. A survey of the underground water is made by hydrologists, usually in connection with geological work.

Soils.—That the soil of any region is an important control in agricultural development is so generally conceded that no argument seems necessary. We have long realized the importance of the soil as a resource, but we have not understood the care necessary to maintain that resource. This is probably due to a failure to understand the relation of soil to structure and topography. If we know the origin of soils, we will be able to comprehend their content and properties. The soil survey which fails to take into account the origin of the soil based on structure conditions loses sight of the primary cause of different soil classes. For any locality we should know: By the breaking down of what rock or rocks was the soil produced? What were the predominant mineral elements in these rocks? Is the soil residual, that is, was it formed by weathering of the underlying rocks? If transported, how was it placed there, by water, glacial action, or wind? What relation does the soil bear to adjacent slopes?

The relation of the water table to soil needs emphasis. Upon the distance of the water table will depend to some extent the use of the land. If too near the surface, swampy, ill-drained conditions result, and the use of the land is limited to very narrow bounds. If the water table is far below the surface, soil structure and texture will be especially important.

Farm management demands intelligent comprehension of soil characteristics. These are intimately related to climate, structure, topography, and drainage. The soil survey must study the soils and classify them as to origin and properties and present a comprehensive discussion of each. The soils must be clearly and accurately shown on detailed maps, so that the farmer will be able to know definitely the kinds and distribution of the soils on his farm. Such a survey should have been made of all public domain preparatory to settlement. If the people could have known whether the land is clayey, sandy, stony, smooth, rough, dry or wet, it would have served to guide them in selecting suitable places, preventing much fraud. The soil survey is needed in settled districts to serve as a basis of farming, road-making and land dealing. It is the natural basis for reshaping the agriculture of old districts. The comprehensive soil survey takes into account all fundamental influences affecting agriculture. It is so far as it goes an agricultural survey.

Native Life.—The native plants and animals of a country represent the natural selection of the fittest for the conditions encountered. The life of a region reflects the topography, soil, and climate under which it lives. The cactus of the desert and the pond lily and watercress of the

lakes and marshes represent the extremes of moisture conditions. For the intermediate stages there are equally well suited forms. Animal life shows the same adaptability to soil, temperature, and moisture. In many cases some forms of native life can be economically perpetuated, and become valuable assets. In developing a new country the first duty should be to learn what is there, and to protect the valuable forms of life, whether plant or animal.

In new territory the native plant life reveals to the keen student much concerning the soil and climatic conditions. In older communities undisturbed patches of vegetation tell the same story. By studying such life the qualities needed in cultivated crops may be fairly well determined and the losses incident to haphazard experimenting avoided.

Certain districts may not be adapted to cultivated crops or domestic animals. This is particularly true of desert and mountain regions. Such districts usually have developed types of life adapted to them. Many of these forms may be of value to man. This is especially true of fur-bearing animals and of a number of valuable plants. In such cases lands which would otherwise be waste can be made productive of relatively good returns.

We have many lakes and streams. The waters in these are not all of the same temperature or purity. The rivers, creeks, and lakes should be utilized for fish production wherever possible. Which are favorable to fish propagation and which are not? What kinds of fish are best adapted to the various conditions existing? The State owes such information to its citizens.

Native life then needs to be considered in a rural survey because: (1) it gives a summary history of soil and climate influences; (2) it may lead to economic production of certain native types of plants and animals; (3) it presents concretely the problem of utilization of waste lands; (4) it will give emphasis to the need of utilizing our lakes and streams as a source of food supply.

Industrial Conditions.—The industrial conditions of a region are practically determined by its physical features. Hence the industrial survey must be based on the fundamental influences if it is to be comprehensive.

In the rural survey the industrial conditions of most importance would be those directly or indirectly concerned with agricultural products. Special farm product investigations are necessary. The forage, grain, and animal products are to be studied with a view of learning the exact present status as well as to determine wherein weaknesses lie and to find means of overcoming them. Under this head will come market facilities and cooperative enterprises. How is the product delivered to market? How may this be reduced? Unnecessary expense of delivery is an economic waste which a community should not tolerate. This brings up the problem of good roads. Are rural highways as good as business economy demands? If not, why not? Where roads are poor, local haulage is expensive and the net returns of farm production de-

creased. What is true of the great common carriers, the railways? In recent years these have been made subject to special phases of the rural survey, apparently with results favorable to both carrier and patron.

Prosperity depends on industry. Industry depends on natural conditions and upon related industrial activities. The human element is important. Hence the need for broad consideration when a survey is undertaken.

Social Conditions.—If a move into new territory is contemplated, the questions of vital interest are not only of the natural and industrial conditions but also in regard to social conditions. By this is meant the classes of people as to race and culture, and the opportunities offered for advance in social and intellectual lines. These characteristics of people are closely associated with their occupations. The pursuits of the people of any locality are, as we have noted, largely dominated by the physical basis of industry. Hence the social survey must recognize the fundamental physical influences if it is to correctly interpret conditions as they exist.

In the social rural survey the data of most vital interest pertain to the following lines:

(a) History of settlement. The time of settlement and the places from which the pioneers came serve to indicate whether a community was given initial impetus to progress. Influx of later settlers needs be noted. Races and nationalities are of interest. These data will serve to explain certain human characteristics and to point out certain influences to be overcome.

(b) Condition of agriculture. The kinds of homes in a region are fairly good indications of its prosperity. The attention given to conserving farm labor, especially the elimination of women's drudgery, gives a clear insight into the social standards prevailing in a community.

(c) Education. The kinds and accessibility of schools represent a line of inquiry of universal interest. How does school equipment in the country compare with that in the city? What is true of lengths of terms, preparation of teachers, school spirit of the patrons? Is it true that our rural schools compare unfavorably with the schools of the cities? If so, why? Good schools are essential to progressive communities. The rural survey should gather reliable data and present the problem fairly and clearly to the people of the State.

(d) Religion. The churches in a community reflect to some extent at least the social standards and ideals of the people. The rural survey needs to consider the denominations represented and to measure their activities in social, intellectual, and religious lines. Are there too many churches? Should the church become the social center of the rural district?

(e) Recreation. Dwellers in the country districts are usually said to give too little attention to the playside of life. Whether or not this conception is true is not positively known. So the questions stand, each demanding answer: Do farmers realize the value and necessity of

play? What are the amusements prevailing in country life? What forms of recreation seem best suited to conditions? What is the relation of the discontent of young people on the farm to lack of recreation advantages? Possibly with investigation of these problems may come suggestions as to remedies. Increased attention to making farm life pleasant means doubly increased happiness and prosperity.

In closing this review of the fundamentals of the rural surveys it should be understood that the importance of the conditions affecting agriculture in general can not be considered as having equal importance at any and every locality. Any one of them may be the controlling feature with the rest of little importance. For instance, the problem may be that of drainage, of low rainfall, of rough land, or some other factor. This will show up in the investigation. Let it be recognized also that every state should complete the fundamental surveys for use in general development as well as for their agricultural importance. One-tenth the amount required for a single battleship would be a sufficient fund for each state. Until this work is done and done with accuracy, there can be no real basis for agriculture and the related industries based thereon. Knowledged gained from the basic surveys will be of great importance in development. Thus far we have magnified notions and unrelated facts in our agricultural surveys. It is time to build from the ground up and to begin to build on the ground and not in the air.

Special surveys relating to agricultural practice and to rural life should follow the physical and biological surveys. It is not a pleasant fact to know that Nebraska has not yet accurately mapped its lands, waters, and forest. The same kind of comment can be applied to several other states. The departments responsible for this work should receive adequate financial support. The people in turn should demand results.

Many special surveys spring up with more or less importance in the development of a state. Most of them are interested in rural affairs as will be shown by a brief review.

Biological Surveys.—Under this head come various investigations of plants and animals to which reference has been made. The best results of such researches are attained when the work is closely connected with the results of physical surveys. It would seem, therefore, that biologists should demand accurate maps and reports of the geologists, geographers, and soil men.

Fruit Survey.—Several states have made investigation in fruit raising. Of these New York State has taken foremost rank. Persons entrusted with the survey work visit the various fruit districts, study the management of orchards, the kinds of land used, marketing, etc. In each case the data gathered thereby are used to the advantage of fruit growers and to the interest of state development. Information of this kind is needed in Nebraska.

The Well-water Survey.—About half of our State has been mapped showing the well-water conditions. These investigations were made primarily for the purpose of improving the public health. The need for

more accurate information concerning the location and care of wells is plainly shown.

Health Survey.—Many persons are now associated with Nebraska's Rural Sanitation and Health Survey. Thousands of homes are visited and accurate data are obtained relating to sanitation. Such investigations should prove valuable to the public.

Farm Management Survey.—This activity is making a special study of rural economics. The object is to determine to what extent there is either good or bad management in the country. Those doing the field work find it necessary to base their work on the physical survey and to check up all the processes involved in the operation of the farm. In this way the investigator detects both the efficient and inefficient methods involved in farm management.

Agricultural Survey.—This is rapidly coming into prominence in several states. The investigations are made in the field and are concerned with all the factors that affect rural industry and rural life. In some places the persons directing the agricultural survey assume to investigate each fundamental condition affecting the agricultural practice. In others the work is conducted primarily on a statistical basis. It would seem that the rural survey should concern itself primarily with physical factors in their relation to rural industry and rural life.

Good Roads Survey.—Many farmers have been opposed to any and all change in road building and road maintenance, because of their fear of new policies. Specific information gathered from surveys shows that the road tax voted in most states is not economically used, and that good economy demands more efficiency in road construction and road maintenance.

Education Survey.—Many persons object to changes in rural schools, whereas others advocate the consolidation of districts and the introduction of subjects that bear a more direct relation to the life of country students. Consequently an attempt is now being made to learn the rural needs in education.

Church Survey.—One of the last movements to gain headway in a number of states is the so-called "religious survey." In some localities the principal purpose seems to have been that of determining the church affiliation rather than to determine the religious beliefs and life of the people, which would be a nearly impossible thing to do. The survey so far as it has progressed, has plainly shown that the religious life of the people bears a close relation to the physical condition of the town or country in which they live. For instance, there are places in Nebraska without church or Sunday school. An inquiry into the cause shows that it would be difficult for the people, being so widely separated to get together for such services. Persons making this survey have been greatly handicapped by the lack of maps and other data.

Summary.

The rural survey must first seek to discover the facts of existing conditions.

It must recognize that fundamental influences exist which largely control the development of a region.

The broad controls which affect development are based on structure, topography, drainage, local climate, soils, and native life. These furnish the essential basis for all rural activities.

The industrial and social conditions are primarily the results of the relation of man to the natural conditions under which he lives and does his work.

The special surveys of agricultural industries and rural life should be made from the common basis of physical conditions and extended into their respective fields. This is the Geographic basis. It gives consistency to the work and value to the results.